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ACCEPTABILITY OF MANAGEMENT TECHNIQUE OF RENEWABLE NATURAL RESOURCES BY RURAL WOMEN IN *KANDI* AREA OF PUNJAB

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ABSTRACT

As primary managers and users of natural resources women play a crucial role in sustaining natural resources. It was against this backdrop that the present investigation 'Acceptability of management technique of renewable natural resources by rural women in kandi area of Punjab'. Kandi area was specifically selected due to its rich biodiversity and involvement of women in management of natural resources. Simple random sampling technique was employed to draw a sample of 100 women. The data was analyzed with the help of common statistical tools such as frequencies percentage, range and cumulative cube root method in different socio-economic categories of respondents such as low, medium and high. To study the acceptability of the technologies first of all based on the observations of rural women respondents and recommendations of the scientists, eco-friendly technologies were identified. Then after, the technologies were introduced to the social system. The selected eco friendly technologies included smokeless chullha, solar cooker, sanitary latrine, vermi composting and bio gas plant. The respondents were exposed to these technologies with the help of selected available media and acceptability was worked out. Acceptability index scores were calculated through application of the formula. In a group of 25 respondents, practical demonstrations-cum discussion and video film were organized separately in four groups to deliver technical input to the respondents on the selected technologies. Pre announcement about the intervention, formation of groups according to location of households and dates of carrying out the programme / show were the three steps followed to introduce the selected technologies to the respondents. Prior to this exposure, informal meetings were arranged with senior citizens and institutional functionaries and the respondents at random, for their mental readiness and physical presence. Majority of the high socio-economic status respondents showed high scores on these technologies. The figures for low socio-economic respondents were higher for take credit but still lower on other variables for all the technologies. Acceptability of solar cooker was low in all socio-economic status categories of respondents. Acceptability of smokeless chulla was high in all socio-economic status categories of respondents.

KEYWORDS: Kandi Area, Management Technique, Renewable Natural Resources & Rural Women

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Original Article

INTRODUCTION

The unsustainable technologies are the main factors contributing to loss biodiversity. Access to more efficient technologies for household use can reduce health and safety problems associated with indoor air pollution[1]. Over the past decades, expansion through technological advancements and the replacement of local plant or livestock varieties with improved or high yielding varieties, large scale conversion of forests and other natural habitats to monoculture farming systems is affecting biodiversity[2].

Cooking is the most energy intensive activity in domestic sector. Nearly 74 per cent of the total energy

was spent by the rural women in the villages for cooking alone. In India, women generally cook under poorly ventilated conditions using biomass fuels, either in pits or in non-portable open U shaped stoves, called chulhas. These stoves burn biomass inefficiently and release high volumes of air pollutants into indoor environments, resulting in elevated pollutant exposures, particularly among women and children. According to the world Health Organization Comparative Risk Study, exposure to smoke from household use of solid fuels is responsible for the premature deaths of approximate 4,00,000 women and in India every year, 28 per cent of all deaths caused by indoor air pollution (IAP) in developing countries[3]. One of the solutions that many believe can have an immediate effect is the adoption of smokeless chulhas. The smokeless Chulha is simple in design and mechanism and operatives similarly as the traditional chulhas used by many families except that it has a chimney. Collection of fuel again leads to trauma, snakes bite, allergic reactions, cuts, abrasions. Solar cooker is the appropriate eco friendly technology to solve the above mentioned problem[4]. The solar cooker requires no fuel; it is less attention demanding but inconvenient to repeatedly change its position with respect to sun. While, smokeless chulha consume more fuel as compared to traditional chulhas[5].

Garbage disposal was identified as a very serious issue causing environmental problems. The improper garbage disposal created unsanitary and unhygienic conditions in the village. So, it was identified important area by the respondents to manage garbage at household level using sanitary latrine. The animal and agriculture waste also created problems of pollution to environment. Therefore, it was considered important to decompose these waste properly so that the environment was not polluted and decomposed waste was useful as composite for agricultural. Vermin composting was identified as eco-friendly appropriate technologies by the scientists to deal the above mentioned problems. Vermicompost is the excreta of earthworm, which are capable of improving soil health and nutrient status. Vermiculture is a process by which all types of biode- gradable wastes such as farm wastes, kitchen wastes, market wastes, bio-wastes of agro based industries, live- stock wastes etc. are converted while passing through the worm-gut to nutrient rich vermicompost. Vermi worms are used here act as biological agents to consume those wastes and to deposit excreta in the process called vermicompost[6-8].

Women have direct contact with natural resources like fuel, food and fodder, forest, water and land especially in rural areas where 70 percent of Indian population reside and is directly dependent upon natural resources. Women are also responsible for using these resources to satisfy the basic needs of their families. Besides, women even play a leadership role for conservation and enhancement of environment. Conservation of resources and promotion of environment cannot be done without involving the women in planning and training for promoting the values for conservation and promotion of environment[9]. Keeping this point in view the present study had been undertaken to access the knowledge and adoption by rural women to various management techniques of renewable natural resources.

MATERIALS AND METHODS

Locate of the Study

The study was conducted in *kandi* area of Punjab. *Kandi* area falls in sub mountainous undulating zone which stands along eastern border and lies between Chandigarh, Hoshiarpur, Dasuya, Mukerian road and the Shivalik foot hills of Punjab. The area has been selected because of its rich biodiversity, rainwater resource, suitability for forestry etc. Besides, women in this area enjoy an intimate relationship with agriculture and animal husbandry operations and participate in a huge way in these operations. Out of this area Nawanshahr (Shaheed Bhagat Singh Nagar) district was selected by application of simple random sampling technique. There are total five blocks in this district i.e. Aur, Nawanshahr, Balachaur, Saroya and

Banga. One block from this district i.e. Balachaur was selected randomly shown in Figure 1. From the selected block, *Takarla* village was purposively selected due to its large size, easy access to socio-economic and ecological conditions and availability of natural resources to rural women.

Selection of Respondents

From the selected village sample of 100 women who were actively engaged in managing and utilizing the natural resources at household level was drawn through simple random sampling technique.

Data Collection

Data was collected through primary and secondary sources of information. Primary source were include information collected through interview schedules as well as PRA techniques. The secondary sources were including literature, scientific information as well as revenue records of the village.

Figure 1: Locale of the Study

Acceptability of Technology

To study the acceptability of the technologies first of all based on the observations of rural women respondents and recommendations of the scientists, eco-friendly technologies were identified. Then after, the technologies were introduced to the social system

Selection of Techniques for the Interventional Programme

Five relevant eco-friendly technologies were identified for intervention on which previously developed and tested media was available. The selected eco friendly technologies included smokeless chullha, solar cooker, sanitary latrine, vermi composting and bio gas plant. The respondents were exposed to these technologies with the help of selected available media and acceptability was worked out. Acceptability index scores were calculated through application of the following formula:

$$AI = \frac{E(RTP+RTC+RTR+RTCr+RUT)}{P\ (RTP+RTC+RTR+RTCr+RUT} \times 100$$

Where;

AI = Acceptability index

E = Actual obtained scores on the parameters

P = Potential scores on the parameters

RTP = Readiness to pay for technology

RTC = Readiness to change

RTR = Readiness to take risk

RTCr = Readiness to take credit

RUT = Readiness to use of technology

The data were collected by application of duly pretested interview schedule prepared for the purpose.

Introduction of the Technology Based Interventional Treatment

Rural women were exposed to the five selected technologies through demo-cum-lecture and discussion method. Pre announcement about the intervention, formation of groups according to location of households and dates of carrying out the programme / show were the three steps followed to introduce the selected technologies to the respondents. Prior to this exposure, informal meetings were arranged with senior citizens and institutional functionaries and the respondents at random, for their mental readiness and physical presence.

In a group of 25 respondents, practical demonstrations-cum discussion and video film were organized separately in four groups to deliver technical input to the respondents on the selected technologies. Consequently, sound technical knowledge was shared with women respondents by organizing four shows.

Their pre and post exposure perceptions regarding the selected eco friendly technologies were recorded. The exposure schedule followed is illustrated in Table 1

Table 1: Exposure Pattern of Eco Friendly Technologies

Sr. No.	Interventional Treatment / Technology	Smokeless Chulla	Solar Cooker	Sanitary Latrine	Vermin Composting	Bio Gas Plant
1.	Lecture	5 minutes	5 minutes	7 minutes	7 minutes	5 minutes
2.	Video show	18 minutes	12 minutes	10 minutes	8 minutes	15 minutes
3.	Discussion	5 minutes	8 minutes	7 minutes	2 minutes	5 minutes
	Total	28 minutes	25 minutes	24 minutes	17 minutes	25 minutes

Note: In all 2 hour exposure was given to the respondents to introduce selected technologies

Data Analysis

All filled up interview schedules was transferred to master tables, tally sheets and frequency tables and then analysis was carried out. The data was analyzed with the help of common statistical tools such as frequencies percentage, range and cumulative cube root method.

RESULTS AND DISCUSSIONS

Socio Economic Profile of Respondents

The socio personal profile of selected respondents in respect of their socio-economic status, age, family type,

family size, education level, land holdings and herd size were studied and data pertaining to these are presented in Table 2. Socio economic status was categorized into three categories i.e. low, medium and high. The findings revealed that majority (38%) of the respondents belonged to low socio economic status followed by 33 percent who belonged to medium socio economic status and 29 per cent were from high socio economic status. Majority (68%) of the respondents belonged to middle age. It is evident from the data that majority of the respondents (59%) belonged to the nuclear family. It referred to total number of persons dwelling together in a family. Regarding the size of the family, the findings revealed that (37%) of the respondents had more than 8 members in their family whereas 33 per cent families had up to 4 members. The results shows that 25 per cent of the respondents had matric (10^{th}) passed. Land is one of the most important assets with a potential to yield income Data revealed that 51 percent respondents had 2.5-5 acres of land followed by 21 percent having less than 2.5 acres. It was found that 49 percent of the respondents had medium herd size followed by 27 percent who possessed large herd size and 19 percent possessed small herd size. Only 5 percent of the respondents reportedly were without livestock.

Table 2: Socio Economic Profile of Respondents

Particulars	Category	Frequency	Percentage
Socio economic status	Low	38	38.00
	Medium	33	33.00
	High	29	29.00
Age	Young age (18 to 35 years)	9	9.00
	Middle age (36 to 55 years)	68	68.00
	Old age (above 55 years)	23	23.00
Family type	Joint	41	41.00
	Nuclear	59	59.00
Family size	Small (up to 4 members)	33	33.00
	Medium (5 to 8 members)	30	30.00
	Large (> 8 members)	37	37.00
Education level	Illiterate	20	20.00
	Can read and write	10	10.00
	Primary (up to 5th)	15	15.00
	Middle (Up to 8th)	5	5.00
	Matric (10th)	25	25.00
	Graduation	15	15.00
	Post graduation	10	10.00
Land holdings	Landless	5	5.00
	Marginal (< 2.5 acre)	21	21.00
	Small (2.5 to 5 acre)	51	51.00
	Medium (5 to 10 acre)	15	15.00
	Large (> 10 acre)	8	8.00
Herd Size	No livestock	5	5.00
	Small herd size (1-3 milch animals or 10 small animals)	19	19.00
	Medium herd size (4 to 6 milch animals or 20 small animals)	49	49.00
	Large herd size (> 6 milch animals or > 21 small animals)	27	27.00

Introduction of the Technologies

A 25 minutes videocassette was developed and shown to four groups of respondents. Before that a lecture cum discussion and practical demonstrations of technologies were organized.

Acceptability of Technologies

The data presented in Table 3 indicated that 33.6 per cent of low socio economic status respondents were ready to change for the smokeless chulla followed by biogas plant (32.4%), sanitary latrine (23.1%), solar cooker (18.2%) and vermin compost (10.2%). The corresponding figures for medium socio economic status respondents were 35.2 percent, 33.4 percent, 24.5 percent, 39.8 percent and 15.4 percent. The corresponding figures for high socio economic status respondents were 66.4 percent, 56.5 percent, 28.5 percent, 61.2 percent and 16.8 percent.

The results regarding ready to use for the technologies revealed that 35.4 percent of low socio economic status respondents were ready to use for the smokeless chulla followed by solar cooker (31.5%), biogas plant (25.2%), sanitary latrine (20.5%) and vermin composting (10.1%). The corresponding figures for medium socio economic status respondents were 37.8 percent, 39.7 percent, 20.4 percent, 23.2 percent and 13.2 percent. The corresponding figures for high socio economic status respondents were 67.2 percent, 47.6 percent, 36.4 percent, 27.8 percent and 15.2 percent.

The information regarding willingness to pay for the technologies were revealed that only 9.4 percent of low socio economic status respondents were ready to pay for the vermin composting followed by sanitary latrine (18.7%), smokeless chulla (22.1%), biogas plant (22.1%) and solar cooker (22.3%). The corresponding figures for medium socio economic status respondents were 13.4 percent, 24.1 percent, 38.5 percent, 33.4 percent and 36.8 percent. The corresponding figures for high socio economic status respondents were 9.4percent, 19.7percent, 46.7percent, 34.2percent and 39.8percent.

It was observed that a sizable number of respondents 22.8 percent were ready to take credit for solar cooker in low socio economic status category followed by smokeless chulla (20.2%), sanitary latrine (20.2%), biogas plant (18.2%) and vermi composting (16.2%). The corresponding figures for medium socio economic status were 19.6 percent, 17.5percent, 12.7percent, 14.2percent and12.4 percent. The corresponding figures for high socio economic status respondents were 21.3 percent, 18.4 percent, 13.2 percent, 19.5 percent and 11.2 percent.

The results regarding ready to take risk for the technologies revealed that 34.7 percent of low socio economic status respondents were ready to take risk for the solar cooker followed by biogas plant (21.3%), smokeless chulla (20.3%), sanitary latrine (20.1%) and vermi composting (9.2%). The corresponding figures for medium socio economic status were 51.3 percent, 51.2 percent, 41.6 percent, 39.6 percent and 10.5 percent. The corresponding figures for high socio economic status respondents were 57.2 percent, 53.4 percent, 52.3 percent, 42.5 percent and 13.3 percent.

Table 3: Distribution of Respondents According to Their Readiness to Change, Use, Pay, Take Credit and Take Risk for Eco Friendly Technologies

Readiness	Socio-Economic Status	Smokeless Chulla (%)	Solar Cooker (%)	Sanitary Latrine (%)	Vermi Compost	Biogas Plant
Change	Low	33.6	18.2	23.1	10.2	32.4
	Medium	35.2	39.8	24.5	15.4	33.4
	High	66.4	61.2	28.5	16.8	56.5
Use	Low	35.4	31.5	20.5	10.1	25.2
	Medium	37.8	39.7	23.2	13.2	20.4

Table 3: Contd.,						
	High	67.2	47.6	27.8	15.2	36.4
Pay	Low	22.1	22.3	18.7	9.4	22.1
	Medium	38.5	36.8	24.1	13.4	33.4
	High	46.7	39.8	19.7	9.4	34.2
Credit	Low	20.2	22.8	20.2	16.2	18.2
	Medium	17.5	19.6	12.7	12.4	14.2
	High	18.4	21.3	13.2	11.2	19.5
Risk	Low	20.3	34.7	20.1	9.2	21.3
	Medium	41.6	51.3	39.6	10.5	51.2
	High	52.3	57.2	42.5	13.3	53.4

In Table 4 the results regarding acceptability of various technologies across the various category of respondent reveal that 71.0 percent of the respondents showed high acceptability for smokeless chulla followed by medium (15.7%) and low (13.1%). Of the medium socio economic status respondents 57.5 percent showed high acceptability for smokeless chulla followed by medium (30.3%) and low (12.1%). However in the high socio economic status category 51.7 percent respondent had high acceptability followed by medium (37.9%) and low (10.3%) scores on acceptability for smokeless chulla.

It was observed that 86.8 percent of the low socio economic status respondent showed low acceptability for solar cooker followed by medium (7.8%) and high (5.2%). Of the medium socio economic status respondents 69.7 percent showed low acceptability for solar cooker followed by medium (18.1%) and high (12.1%). However in the high socio economic status category 58.6 percent respondent had low acceptability followed by medium (24.1%) and high (17.2%) scores on acceptability for solar cooker.

The information regarding acceptability of various technologies reveals that 42.1 percent of the low socio economic status respondent showed low acceptability for sanitary latrine followed by medium (34.2%) and high (23.6%). Of the medium socio economic status respondents 39.3 percent showed medium acceptability for sanitary latrine followed by high (36.3%) and low (24.2%). However in the high socio economic status category 58.6 percent respondent had high acceptability followed by medium (24.1%) and low (17.2%) scores on acceptability for sanitary latrine.

Table 4: Acceptability for Various Technologies among Socio-Economic Categories of Respondents

Socio-economic status	Smokeless Chulla			Solar Cooker			Sanitary Latrine			Vermi Compost			Bio Gas Plant		
	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Low (f)	5	6	27	33	3	2	16	13	9	30	5	3	22	11	5
(%)	13.1	15.8	71.0	86.8	7.8	5.2	42.1	34.2	23.6	78.9	13.1	7.8	57.8	28.9	13.1
Medium (f)	4	10	19	23	6	4	8	13	12	5	18	10	11	15	7
(%)	12.1	30.3	57.5	69.7	18.1	12.1	24.2	39.3	36.3	15.1	54.5	30.3	33.3	45.4	21.2
High (f)	3	11	15	17	7	5	5	7	17	4	8	17	7	15	7
(%)	10.3	37.9	51.7	58.6	24.1	17.2	17.2	24.1	58.6	13.7	27.5	58.6	24.1	51.7	24.1

The results regarding acceptability of various technologies across the various category of respondent reveal that 78.9 percent of the low socio economic status respondent showed low acceptability for vermi composting followed by

medium (13.1%) and high (7.8%). Of the medium socio economic status respondents 54.5 percent showed medium acceptability for vermi composting followed by high (30.3%) and low (15.1%). However in the high socio economic status category 58.6 percent respondent had high acceptability followed by medium (27.5%) and low (13.7%) scores on acceptability for vermi composting.

It was observed that 57.8 percent of the low socio economic status respondent showed low acceptability for biogas plant followed by medium (28.9%) and high (13.1%). Of the medium socio economic status respondents 45.5 percent showed medium acceptability for biogas plant followed by low (33.3%) and high (21.2%). However in the high socio economic status category 51.7 percent respondent had medium acceptability followed by low (24.1%) and high (13.7%) scores on acceptability for biogas plant.

CONCLUSIONS

The following conclusions may be drawn from present study:

- Majority of the low socio-economic status respondents were ready to take credit for technologies but less for biogas plant.
- Majority of the respondents from high socio-economic status were ready to take risk followed by readinss to change and readiness to use.
- More than 65 per cent of the high socio-economic status respondents were ready to accept smokeess chulla technology followed by 60 percent who were ready to accept solar cooker technology.
- The figures for low socio-economic respondents were higher for take credit but still lower on other variables for all the technologies.
- Acceptability of solar cooker was low in all socio-economic status categories of respondents.
- Acceptability of smokeless chulla was high in all socio-economic status categories of respondents.
- Most of the high socio-economic status respondents showed high scores on these technologies.
- As for as acceptability of introduced technologies was concerned, as far as management of natural resources is concerned. It was found that due to scarce availability, people have started using alternate sources to meet their requirements e.g. LPG, kerosene, tap water, oilseeds for fodder etc.

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